CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 90-098

NPDES NO. CA0028398

WASTE DISCHARGE REQUIREMENTS FOR:

U. S. DEPARTMENT OF ENERGY
STANFORD LINEAR ACCELERATOR CENTER
MENLO PARK, SAN MATEO COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter the Board, finds that:

1. U. S. Department of Energy, Stanford Linear Accelerator Center, Menlo Park, San Mateo County operates a large research laboratory devoted to experiments in high energy physics. The main tool for this research consists of a 2 mile long linear accelerator which can produce beams of electrons and positrons with energies of up to 50 billion electron volts.

2. The discharge consists of blowdown from five cooling towers, groundwater that has seeped into the accelerator gallery, and some rain runoff into three natural drainage areas, which merge into San Francisquito Creek, a tributary to San Francisco Bay, both waters of the United States. The following wastes containing pollutants are discharged into San Francisquito Creek:

   a. Waste No. 001 consists of a monthly average of 8,500 gallons per day of blowdown water cooling tower 1201, located adjacent to the first mile of the accelerator. Wastewater is discharged intermittently via an open ditch to San Francisquito Creek at a point located approximately 2/3 of a mile east of the west end of the gallery. Flows can reach a maximum of 18,500 gallons per day.

   b. Waste No. 002 consists of a monthly average of 8,500 gallons per day from cooling tower 1202, located adjacent to the second mile of the accelerator. Wastewater is intermittently discharged via an open ditch to San Francisquito Creek at a point located approximattely 1 1/3 miles east of the west end of the gallery. Flows can reach a maximum of 18,500 gallons per day.

   c. Waste No. 003 consists of a monthly average of 17,500 gallons per day of combined discharge of blowdown water from cooling towers 101 and 1701 located at the Beam Switchyard and Research Area and at the Central Utility Building. The combined effluent is discharged via an open concrete channel and drainage ditch to the San Francisquito Creek at a point where the creek intersects Alpine Road. Flows can reach a maximum of 62,500 gallons per day.

d. Waste No. 004 consists of an annual average of 5,000 gallons per day of blowdown water from the newly constructed cooling tower 1200, which has the same cooling load as cooling tower 101. The effluent is discharged to the same point in San Francisquito Creek as Waste 001, and the rate of discharge of Waste 001 will be reduced to some extent, since tower 1200 will share some of that cooling load. Flows can reach a maximum of 9,000 gallons per day.

3. This Order serves as a NPDES permit, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21110 of Division 13) of the Public Resources Code (CEQA) pursuant to Section 13389 of the California Water Code.

4. The Regional Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region, (Basin Plan), on December 17, 1986, and the State Water Resources Control Board approved the Plan on May 21, 1987. The provisions of this permit are consistent with the objectives of the Basin Plan.

5. The beneficial uses of San Francisquito Creek and San Francisco Bay are:

a. Water contact recreation
b. Non-contact water recreation
c. Navigation
d. Open commercial and sport fishing
e. Wildlife habitat
f. Estuarine habitat
g. Fish spawning and migration
h. Industrial uses
i. Preservation of rare and endangered species
j. Shellfishing

6. The discharge is currently governed by NPDES Permit No. CA0028398, Order No. 85-36 as amended by Order No. 87-004 which allowed for alleviation of discharge limits during a study period.

7. The Basin Plan states in part:

a. "...It shall be prohibited to discharge:

1. "Any wastewater which has particular characteristics of concern to beneficial uses at any point at which the waste water does not receive a minimum initial dilution of at least 10:1 or into any nontidal water, dead-end slough, similar confined waters, or any immediate tributaries thereof.

This prohibition will provide an added degree of protection from the continuous effects of waste discharge. It will also create a buffer against the effects of abnormal discharges caused by plant upsets or malfunctions.

2. "Any wastewater which has particular characteristics of concern to beneficial uses to San Francisco Bay south of the

Dunbarton Bridge." This prohibition is consistent with the Bays and Estuaries Policy. This area is one which has experienced chronic water quality problems and has very limited assimilative capacity.

b. "Exceptions to these Prohibitions...will be considered for discharges where:

1. an inordinate burden would be placed on the discharger relative to beneficial used protected and an equivalent level of environmental protection can be achieved by alternative means, such as alternative discharge site, a higher level of treatment, and/or improved treatment reliability; or

2. a discharge is approved as part of a reclamation project; or

3. it can be demonstrated that net environmental benefits will be derived as a result of the discharge."

8. The discharger's waste has particular characteristics of concern to beneficial water uses and is discharged into non-tidal waters, at a point at which the wastewater receives less than 10:1 initial dilution, and subsequently flows into the Bay south of the Dumbarton Bridge.

9. The discharger has requested an exception to both Basin Plan Prohibitions 1 and 2, on the basis that the discharge provides a net environmental benefit. The discharger submitted a report documenting that the discharge provides year round flow in an otherwise seasonal creek. The year round flow results in riparian habitat suitable for fish and wildlife, and other aquatic life. In addition, the discharger contracted a one year study to assess the impact of existing and possible increased discharges upon the water quality and aquatic habitat of San Francisquito Creek starting in 1987, and concluded in June 1988. The study determined algae nutrient dependancy, characterized fish and benthos populations, and monitored other key factors including water temperature. The study adequately demonstrated that the aquatic habitat of San Francisquito is not adversely affected by the discharge.

10. The stream flow enhancements provided by the discharger's flow when coupled with the relatively innocuous nature of the untreated wastewater satisfy conditions necessary for the Board to grant exceptions to the discharge prohibitions described above.

11. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

12. The Board, in a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED that the discharger, in order to meet the provisions

contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Federal Water Pollution Control Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. Prohibitions

1. Chemical additives used in the cooling tower make-up water shall contain no toxic, or toxic bioaccumulatory agents at the time of discharge of blowdown.

B. Effluent Limitations

1. The discharge of Wastes 001, 002, 003, or 004 containing constituents in excess of the following limits is prohibited:

Constituents	Units	Daily Maximum	Monthly Average
Total Dissolved Solids	mg/l	2,000	1,500
Total Phosphate	mg/l	25	15
Settleable Matter	ml/l-hr	0.2	0.1
Chlorine Residual	mg/l	Instantaneous Maximum= 0.0	
Arsenic (b)	ug/l	20	
Cadmium	ug/l	10	
Chromium(VI) (a)	ug/l	11	
Copper	ug/l	20	
Lead	ug/l	5.6	
Mercury	ug/l	1	
Nickel	ug/l	7.1	
Silver	ug/l	2.3	
Zinc	ug/l	58	

a. The Discharger may meet this limit as total chromium.

b. The Discharger has initiated a proposal for an alternate limit for some Table VI-1 metals following procedures outlined in the Basin Plan. A time schedule for submittal of a proposed alternate limit is presented in Provision D.8. of this Order.

2. Wastes 001, 002, 003, or 004 shall not have a pH less than 6.5 nor greater than 8.5.

3. The survival of test fishes of the specie Oncorhyncus Mykiss,

(rainbow trout) in a 96 hour static bioassay of the discharge of Wastes 001, 002, 003, or 004 shall be a running three sample median of 90 percent survival.

C. Receiving Water Limitations

1. The discharge of waste shall not cause the following conditions to exist in waters of the United States at any place:

   a. Floating, suspended, or deposited macroscopic particulate matter or foam;

   b. Bottom deposits or aquatic growths;

   c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;

   d. Visible, floating, suspended, or deposited oil or other products of petroleum origin;

   e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.

2. The discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board as required by the Federal Water Pollution Control Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

3. Dissolved oxygen — 7.0 mg/l minimum. Median for any three consecutive months, not less than 80% of saturation. When natural factors cause lesser concentrations than those specified above, then this dicharge shall not cause further reduction in the concentration of dissolved oxygen.

D. Provisions

1. The discharge of waste shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

2. The discharger shall comply with the attached self-monitoring program as ordered by the Executive Officer.

3. This Order includes all items of the attached "Standard Provisions, Reporting Requirements and Definitions" dated

December 17, 1986.

4. This order expires July 18, 1995. The discharger must file a report of waste discharge in accordance with Title 23, Chapter 3, Subchapter 9 of the California Administrative Code not later than 180 days in advance of such expiration date as application for issuance of new waste discharge requirements.

5. This Order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the Federal Water Pollution Control Act or amendments thereto, and shall become effective ten (10) days after date of its adoption provided the Regional Administrator, Environmental Protection Agency, has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

6. The discharger shall comply with all prohibitions and effluent and receiving water limitations of this Order immediately upon adoption.

7. In order to prevent the accidental release of toxic substances of other materials deleterious to water quality, the discharger shall develop and implement a Best Management Practices Plan (BMP).

   The BMP Plan shall be consistent with the general guidance contained in the publication entitled "NPDES Best Management Practices Guidance Document", dated June 1981, prepared by the U.S. EPA, Office of Water Enforcement and Permits, NPDES Technical Support Branch. The plan shall include management practices to ensure that agents used for algae and slime control in the cooling tower make-up water are not present in toxic concentrations when blowdown water is released.

   The BMP plan shall be submitted to the Executive Officer, for approval, within six months of the adoption of this permit, and shall be implemented by that time or sooner at the discharger's discretion.

8. Table IV-1 Metals Alternate Limit Study

   Compliance with Effluent Limitation B.1. or any amendments to Effluent Limitation B.1. shall be achieved according to the following time schedule:

	Task	Compliance Date
a.	Complete an investigation to determine if all sources of the Table IV-1 metals are being controlled through the application of all reasonable treatment and source control measures and submit a report on the findings. If the report determines that all sources of the metals are not being controlled through the application of all reasonable treatment and source	December 1, 1990

control measures, then the report shall include a schedule of actions along with milestone dates, acceptable to the Board's Executive Officer which will assure that all sources of toxic metals are being controlled through the application of all reasonable treatment and source control measures.

b. Submit a proposal for an alternate limit for the metals in a technical report. The report shall include an assessment of the impact of the proposed alternate effluent limits on the beneficial uses of the receiving water, and must include a demonstration that the costs of additional treatment and source control measures do not bear a reasonable relationship to the level of beneficial uses protected by such additional measures. The report shall also include a schedule of specific control strategies along with milestone dates, acceptable to the Board's Executive Officer, for the control of non-point sources of pollution (including urban runoff) within or upstream from the Discharger's contribution to the total pollutant load. — July 1, 1991

c. Achieve compliance with the metalsy effluent limits listed under Effluent Limitation B.1. of this Order or an alternate to Effluent Limitation B.1. which is approved by the Board. — December 1, 1991

9. All chemical or biological analysis required by this order shall be accompanied by adequate and sufficient quality assurance/quality control (QA/QC) protocals, to the satisfaction of the Board's Executive Officer. This QA/QC analysis shall be at a minimum that required by the standard methods employed, and a summary of the QA/QC data shall accompany the analytical reports to which it applies.

I, Steven R. Ritchie, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 18, 1990.

Steven R. Ritchie
Executive Officer

Attachments:
Standard Provisions
Parts A & B

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM
FOR

STANFORD LINEAR ACCELERATOR CENTER

NPDES NO. CA0028389

ORDER NO. 90-098

CONSISTS OF

PART A (dated December 1986)

AND

PART B

PART B

I. DESCRIPTION OF SAMPLING STATIONS AND SCHEDULE OF SAMPLING, ANALYSES, AND OBSERVATIONS

Analyses, observations, and examinations shall be performed according to the specifications shown in Table I.

A. EFFLUENT

Station	Description
Waste No. 001	At the point at which all waste tributary from cooling tower 1201 is present.
Waste No. 002	At the point at which all waste tributary from cooling tower 1202 is present.
Waste No. 003	At the point at which all waste tributary from cooling towers 101 and 1701, located at the Central Utility Building and the Beam Switchyard and Research Area are present.
Waste No. 004	At the point at which all waste tributary from cooling tower 1200 is present, prior to mixing with cooling tower 1201 discharge.

II. MISCELLANEOUS REPORTING

A. The Discharger shall submit a sketch showing the locations of all points of discharge. This shall be updated by the discharger as changes occur.

III. SCHEDULE OF SAMPLING AND ANALYSIS

A. The schedule of sampling and analysis for Waste No. 1 shall be that given in Table I.

B. Sample collection, storage, and analyses shall be performed according to the latest 40 CFR 136 or other methods approved and specified by the Executive Officer.

IV. MODIFICATIONS TO PART A

A. Exclude paragraph D.3., E.4., F.3., and F.5.

B. Written self-monitoring reports shall be filed for each calender month in which a discharge occurs and filed no later than the

fifteenth day of the following month.

I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Board's Resolution 73-16 in order to obtain data and document compliance with waste discharge requirements established in Order No. 90-098.

2. Is effective on the date shown below.

3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the Discharger and revisions will be ordered by the Executive Officer, pursuant to 40 CFR 124.4.

Steven R. Ritchie
EXECUTIVE OFFICER

Effective Date: July 28, 1990

Attachment:

Table I

TABLE I
SCHEDULE FOR SAMPLING, MEASUREMENTS, AND ANALYSES

SAMPLING STATIONS	E-001, E-002 and E-003, E-004			C-R & C-1				
TYPE OF SAMPLES	O	C-24	G	G				
Flow rate (gallons/day)		cont						
Settleable Matter (ml/l/hr)			M					
Oil & Grease (mg/l and lbs/day)			W					
pH (units)			W					
Temperature (°F)			W	(2) W				
Toxicity (% survival)			M					
All Applicable Standard Observations	M			M				
Chlorine Residual & Dosage (mg/l and lbs/day)			(1) E					
Total Phosphate (as PO_4) (mg/l)			W	(2) W				
Cooling Water Chemicals (Type and lbs/month added)	M							
Total Suspended Solids (TSS) (mg/l & kg/d)			W	(2) W				
Total Dissolved Solids (TDS) (mg/l & kg/d)			W	(2) W				
Basin Plan Table IV-1 Metals (ug/l)			Q					

LEGEND FOR TABLE

Type of Sample

G = grab sample
C = composite sample - 24-hour
O = observation

Frequency of Sampling

M = once each month
2/W = twice a week
E = each occurrence
W = weekly
Q = quarterly

1. To be sampled after each instance of chlorine application directly from the cooling water and prior to recommencing discharge.

2. To be sampled on days coincident with effluent sampling.